

Mr. Ashe's share of the bulletin is a careful description of the forest regions of the state, in which he makes the reader familiar with the practical aspects of his subject, dealing especially with the present condition of the great pine region, and the results of injudicious cutting, turpentine orcharding, pasturing, and fires.

The bulletin is not only of permanent value for the facts it contains, but is rich in suggestion, for the reader can hardly fail to approach a study of the forest problem in a more rational way after he has read these notable articles.

—CHARLES A. KEFFER.

NOTES FOR STUDENTS.

MR. WALTER HOUGH⁶ discusses "The environmental interrelations in Arizona" from the standpoint of an ethno-botanist. From this point of view, of course, the "interrelations" are chiefly those existing between the Arizona flora and the tribes of Arizona Indians, such as the Hopi, the Moki, and the Tuñi Indians. But Mr. Hough discusses in some detail the extremely xerophytic nature of the Arizona flora, analyzing, not very technically, its ecological features, showing that the flora of which the Indians could make use was a meager one, of extreme type and embracing some 160 indigenous species, nearly every one of which has been brought into use as a food or forage plant, as medicinal, in folk lore and religion, in domestic or other usage. Probably no other flora is so rich in descriptive folk names, and this fact bespeaks the very close "interrelations" existing. Among the Hopi Indians over 35 per cent. of the species of plants is made use of in medicine, folk lore, and religion, and it seems that the use of plants for food, house-building, and such practical purposes is of less importance. In this arid region tribe and flora are brought into very close relation, both being dependent upon the same meager water supply; and the very characters selected by plants as protective against the rigors of environment are often those most useful to the tribes in furnishing medicines or charms of real or inferential value.

A valuable part of Mr. Hough's contribution is the complete list of species, including about 173 species, with the descriptive names given by the Hopi Indians, and the part each species plays in relation to the tribe.—W. L. BRAY.

THREE CASES of abnormal development of the inferior ovary in species of *Opuntia* are described and illustrated with colored plates by Dr. Ramírez, of Mexico.⁷ In the first a fruit, otherwise normal, appears as the terminal

⁶ Amer. Anthropologist **11**: 133-155. 1898.

⁷ Tres monstruosidades en ovarios íferos. *Annales del Instituto Medico Nacional* **3**: 223-227. [Lám. V-VII] Ja., F. 1898.

third of a cladodium, the one being a direct continuation of the other without constriction or articulation. The second case is of a fruit formed within the upper portion of a cladodium and swelling the otherwise flat branch as if the ovary had been forced into it from above. The third anomaly is of a fruit bearing on its sides thirteen smaller fruits, all apparently normal. Dr. Ramírez discusses their morphological significance and concludes that all three cases strongly support the view that the inferior ovary of the Cactaceæ is axile in nature.—FREDERICK LEROY SARGENT.

BELAJEFF'S recent paper⁸ on the reduction division of the plant nucleus is quite a surprise. Haecker intimated in 1895 that the figures of Strasburger and Guignard might indicate a reduction division in plants, but the efforts of botanists, especially of Miss Sargent, have given only negative evidence. The zoologist Ishikawa, who studied pollen mother cells of *Allium fistulosum*, gives the only report of a reduction division in plants. Strasburger and Mottier described such a division in pollen mother cells of *Lilium* and *Podophyllum*, but almost immediately acknowledged that the work needed reinvestigation. Belajeff now comes forward with a genuine reduction division (in the sense of the Freiburg school) in the second division of the pollen mother cells of *Iris*. For evidence he relies upon the shape of the chromosomes, and gives figures illustrating the shape taken by chromosomes in vegetative division, heterotype division, and his reduction division. He claims that previous investigators have not been able to interpret properly this division on account of vague conceptions of division in vegetative cells. Following Haecker's scheme his formulæ are as follows. For the vegetative division:

$$\begin{array}{cccccccc} a & b & c & d & e & f & \text{etc.} \\ \hline a & b & c & d & e & f & \text{etc.} \end{array}$$

In the heterotype division the chromosomes are united in pairs with the following formula:

$$a + b \quad c + d \quad e + f \quad \text{etc.}$$

Their division leads to the formation of daughter nuclei with the segments:

$$\begin{array}{cccccccc} a + b & c + d & e + f & \text{etc.} \\ \hline a + b & c + d & e + f & \text{etc.} \end{array}$$

The second division in the pollen mother cells leads to the separation of the halves of the segments:

$$\begin{array}{cccc} a & c & e & \text{etc.} \\ \hline b & d & f & \text{etc.} \end{array}$$

Whether the grouping of the segments is accidental or determined must remain unanswered. At any rate, the chromosomes of the nuclei resulting

⁸ Ber. der deutsch. Bot. Gesells. 16:27-34. 1898.

from the reducing division are not identical, a fact which may help explain the difference between descendants of the same parents.—CHAS. J. CHAMBERLAIN.

ONE OF THE MOST common requests made of a botanist is to give some simple rule by which edible and poisonous fungi may be distinguished. The Department of Agriculture has done great service in publishing a bulletin upon the subject, to which botanists may refer their correspondents, and it could not have done a wiser thing than to secure Dr. W. G. Farlow to prepare it. The account is very simple and effective and is designed to be a sort of primer for the beginner who does not know fungi, but who wants to eat them. The following rules are given for the beginner:

1. Avoid fungi when in the button or unexpanded stage; also those in which the flesh has begun to decay, even if only slightly.

2. Avoid all fungi which have stalks with a swollen base surrounded by a sac-like envelope, especially if the gills are white.

3. Avoid fungi having a milky juice, unless the milk is reddish.

4. Avoid fungi in which the cap, or pileus, is thin in proportion to the gills, and in which the gills are nearly all of equal length, especially if the pileus is bright colored.

5. Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish, and in the case of other tube-bearing forms experiment with caution.

6. Fungi which have a sort of spider web or flocculent ring around the upper part of the stalk should in general be avoided.—J. M. C.

FL. TASSI, of the University of Siena, has been investigating the anatomy and morphology of the Proteaceæ, using *Stenocarpus sinuatus* Endl. as a type. The results are published in a bulletin of the laboratory, with thirteen plates, more or less colored. The many interesting anatomical peculiarities of the group are plainly set forth in detail. The morphological features seem much as usual, at least so far as they relate to the development of the microspores and megaspores, and their germination.—J. M. C.

MARCUS HARTOG⁹ has suggested recently that the function of chromatin in nuclear division may be a mechanical one, and that linin may be the important substance. "The splitting of a viscid thread is one of the most difficult mechanical feats to accomplish. Suppose, then, that there is a certain polarity about the granules of chromatin, through which, after their division, they tend to recede from their fellows as far as possible; through this they will determine a splitting of the filament on which they are strung. The close of nuclear division sees their task accomplished; and, as we should expect, the chromatic granules, having fulfilled this appointed task, now atrophy, and

⁹Natural Science 13:119. 1898.

remain in this state till the approach of a new cell-division determines a fresh growth of their substance. According to this view the linin is the transmitter of inherited properties, and the chromatin has a purely mechanical function in karyokinesis."—J. M. C.

ITEMS OF TAXONOMIC INTEREST are as follows: In his treatment of the Umbelliferæ (Engler and Prantl *Nat. Pflanzenfam.*) Drude proposes the new genus *Tænidia*, based upon *Pimpinella integerrima* Gray (3⁸: 195), and reduces *Berula* to a subgenus under *Sium* (3⁸: 195).—W. P. Hiern has described (*Jour. Bot.* 36: 289–291. 1898) two new genera of Compositæ from Welwitsch's African collection: *Pseudotrichia*, an asteroid form; and *Adenogonum*, a genus which does not accord with any of the recognized tribes, but is thought to be an aberrant senecioid form.—James Britten (*Jour. Bot.* 36: 297–302) has been examining the types, mostly in the Banksian herbarium, of plants described in Smith's "History of the rarer lepidopterous insects of Georgia" (1797), and publishes his conclusions in reference to six species, which have considerable bearing upon their synonymy.—The *Bulletin of Miscellaneous Information*, issued by the Royal Botanic Gardens of Trinidad, continues its publication of the pteridophytes of the British West Indies and Guiana. The current one (no. 15) presents the genera *Alsophila* (14 spp.), *Hemetelia* (15 spp.), and *Cyathea* (25 spp.).—Thomas H. Kearney has published (Bulletin 11, Division of Agrostology) a revision of the North American species of *Calamagrostis*, recognizing thirty-eight species north of Mexico, eleven of which are new. The revision also contains a very interesting section upon the ecology of the group.—In the same bulletin F. Lamson-Scribner describes and illustrates, with seventeen plates, twenty-eight new species of grasses. New species are added to *Elymus* (5), *Poa* (5), *Panicum* (4), *Sporobolus* (3), *Stipa* (3), *Agropyron* (2), and six other genera.—George V. Nash has published (*Bull. Torr. Bot. Club* 25: 432–450. 1898) a revision of *Chloris* and *Eustachys* in North America. Although often united as two sections of a single genus, the author regards them as worthy of generic separation. Ten species of *Chloris* are recognized, two of which are new, and four species of *Eustachys*.—E. O. Wooton continues (*Bull. Torr. Bot. Club* 25: 451–459. 1898) his descriptions of miscellaneous new plants from New Mexico, the last fascicle adding species to ten genera.—J. M. C.